

1 1. A multiband UWB communication transmitter
2 comprising:
3 a polyphase-based multichannel;
4 a shaped pulse generator; and
5 a N-switch in parallel to connect from the
6 polyphase-based multichannel to the shaped pulse generator
7 coupled to a multichannel-based multicarrier modulator.
8

9 2. The multiband UWB communication transmitter of
10 claim 1 wherein said polyphase-based multichannel includes
11 an adjustable serial-to-parallel unit or a switch unit with
12 rotating in a counterclockwise at an adjustable uniform
13 speed.
14

15 3. The multiband UWB communication transmitter of
16 claim 2 wherein the adjustable serial-to-parallel unit
17 produces from one serial symbol sequence to N-channel
18 symbol sequence in parallel, with one symbol separation on
19 each channel for BPSK modulation or with two symbol
20 separation on each channel for QPSK modulation.
21

22 4. The multiband UWB communication transmitter of
23 claim 2 wherein the switch unit with rotating in a
24 counterclockwise at an adjustable uniform speed generates
25 from one serial symbol sequence to N-channel symbol
26 sequence in parallel for BPSK modulation when said switch

27 rotates to one of the N-channel at uniform speed of every
28 symbol or for QPSK modulation when said switch rotates to
29 one of the N-channel at uniform speed of every two symbols.
30

31 5. The multiband UWB communication transmitter of
32 claim 1 wherein said shaped pulse generator includes RAM or
33 ROM memories for storing shaped digital pulses, A/D
34 converters with same sampling frequency rate, and
35 controllable switches to connect from the RAM or ROM
36 memories to the A/D converters.
37

38 6. The multiband UWB communication transmitter of
39 claim 5 wherein the shaped digital pulses are positive and
40 negative indoor shaped digital pulses with a phase
41 difference, and positive and negative outdoor shaped
42 digital pulses with a phase difference.
43

44 7. The multiband UWB communication transmitter of
45 claim 6 wherein said positive and negative indoor shaped
46 digital pulses are used for the indoor UWB communication
47 transceiver and said positive and negative outdoor shaped
48 digital pulses are used for the outdoor UWB communication
49 transceiver.
50

51 8. The multiband UWB communication transmitter of
52 claim 6 wherein said positive and negative indoor or

53 outdoor shaped digital pulses are used to represent one
54 symbol for BPSK modulation or to represent two symbols for
55 QPSK modulation with a delay time of said positive and
56 negative indoor or outdoor shaped digital pulse in
57 position.

58

59 9. The multiband UWB communication transmitter of
60 claim 1 wherein said multichannel-based multicarrier
61 modulator provides N independent carrier for N-channel
62 based shaped digital pulses of said shaped pulse generator
63 and coherently combines the shaped digital pulses with the
64 N independent carrier of all the channels.

65

66 10. A shaped pulse generator having multichannel
67 switches comprising memory banks of storing shaped digital
68 pulses, memory bank switches, and A/D converters that
69 produce said shaped digital pulse based on one symbol for
70 BPSK modulation channel or based on two symbols for QPSK
71 modulation.

72

73 11. The shaped pulse generator of claim 10 wherein
74 said memory banks includes four RAM or ROM memories that
75 store the positive indoor shaped digital pulse, the
76 negative indoor shaped digital pulse, the positive outdoor
77 shaped digital pulse, and negative outdoor shaped digital
78 pulse.

79 12. The shaped pulse generator of claim 10 wherein
80 said multichannel switches connect to the A/D converter
81 that connects to the RAM or ROM memories of storing said
82 positive indoor and outdoor shaped digital pulse for the
83 indoor and outdoor UWB operation based on one "0" symbol
84 for BPSK modulation.

85

86 13. The shaped pulse generator of claim 10 wherein
87 said multichannel switches connect to the A/D converter
88 that connects to the RAM or ROM memories of storing said
89 negative indoor and outdoor shaped digital pulse for the
90 indoor UWB operation based on one "1" symbol for BPSK
91 modulation.

92

93 14. The shaped pulse generator of claim 10 wherein
94 said multichannel switches connect to the A/D converter
95 that connects to the RAM or ROM memory of storing said
96 positive indoor and outdoor shaped digital pulse for the
97 indoor and outdoor UWB operation based on the most
98 significant symbol "0" of two symbols for QPSK modulation.

99

100 15. The shaped pulse generator of claim 10 wherein
101 said multichannel switches connect to the A/D converter
102 that connects to the RAM or ROM memories of storing said
103 negative indoor and outdoor shaped digital pulse for the

104 indoor and outdoor UWB operation based on the most
105 significant symbol "1" of two symbols for QPSK modulation.
106

107 16. The shaped pulse generator of claim 10 wherein
108 said memory bank switches connect to the RAM or ROM
109 memories of containing the positive and negative indoor
110 shaped digital pulses during the indoor UWB operation.
111

112 17. The shaped pulse generator of claim 10 wherein
113 said memory bank switches connect to the RAM or ROM
114 memories of containing the positive and negative outdoor
115 shaped digital pulses during the outdoor UWB operation.
116

117 18. A multiband UWB communication receiver
118 comprising:
119 multichannel-based multicarrier down converters;
120 A/D converters connected from anti-aliasing
121 analog filters to digital receiver filters;
122 rake receivers; and
123 adjustable polyphase-based parallel-to-serial.
124

125 19. The multiband UWB communication receiver of claim
126 18 wherein said adjustable polyphase-based parallel-to-
127 serial produces an output of the serial sequence from
128 output sequences of said rake receivers by using a
129 controllable switch.

130 20. The multiband UWB communication receiver of claim
131 19 wherein said controllable switch in a clockwise
132 direction rotates at a uniform speed of one symbol for BPSK
133 demodulation or at a uniform speed of two symbols for QPSK
134 demodulation.